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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/707,723	11/07/2000	Kazuyuki Sakakibara	CTW-006	9799

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LAHIVE & COCKFIELD
28 STATE STREET
BOSTON, MA 02109

EXAMINER

TSANG FOSTER, SUSY N

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 04/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

T.D-6

Office Action Summary

Applicati n N .

09/707,723

Applicant(s)

SAKAKIBARA ET AL.

Examiner

Susy N Tsang-Foster

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-- The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6 and 8-24 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statements filed on 11/7/2000 and 1/28/2002 have been considered by the Examiner.

Preliminary Amendment

3. The preliminary amendment filed on 11/7/2000 has been entered.

Specification

4. The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973).

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5. The disclosure is objected to because of the following informalities:

The last two lines on page 3 appear to be a dangling sentence that does not begin with a capital or end with a period. However, these two lines appear to be redundant when compared to page 4, lines 1-2.

On page 4, the last paragraph states that “the battery pack comprises one first cell group located generally in the center thereof and two second cell groups interposing the first cell group across branches of the at least one air passage.” However, as seen in Figures 12-13, the first cell group is interposed between the two second cell groups. The two second cell groups sandwich the first cell group. Furthermore, it appears that the two second cell groups lie along the branches of the at least one air passage, not across the branches of the air passage.

Similarly, on page 5, lines 21-25 state “each second cell group has inner surfaces in contact with one of the second radiator plates, and each second cell group is arranged in a single row of cells bent at one intermediate cell toward the inner surface, the portion of each second radiator plate corresponding to the intermediate cell including two bulges adjacent to and interposing the intermediate cell.” However, Figure 15 shows that the two bulges 73a does not interpose the intermediate cell 14c but that intermediate cell 14c is interposed between the two bulges 73a.

On page 5, line 27, “reminder” should be “remainder”.

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On page 10, lines 10 and 11, “lower case 63” should be “lower case 53”.

On page 11, line 17, “with in” should be “within”.

On page 13, lines 29-33 state “considering increases in temperature of the cooling air as it proceeds downstream, the portion 74a of the radiator plate 74 that surrounds and comes into contact with the downstream cell 14f is made thinner than the portion of the plate that surrounds and comes into contact with the upstream cell 14e so as to realize an equal cooling effect on both cells 14e and 14f” appears to contradict applicants’ present invention of increasing the heat capacity of the radiator plate in the downstream direction of a flow of cooling air. It would appear that the portion of the radiator plate that surrounds and comes into contact with the downstream cell 14f should be made thicker to increase the heat capacity at that portion of the radiator.

On page 14, line 16, “holder 76” should be “holder 16”.

Throughout page 15 and possibly elsewhere in the specification, “differring” should be spelled as “differing”.

Appropriate correction is required.

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6. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

In claim 1, the limitation “at least one radiator provided in the at least one air passage so as to be in contact with one or more outer surfaces of the cells” is not in the specification.

Instead, page 2, last paragraph of the specification states “at least one radiator provided in the at least one air passage so as to be in contact with outer surfaces of the cells.”

In claim 8, the limitation “radiator means provided in the at least one air passage so as to be in contact with one or more outer surfaces of the cells” is not in the specification. Instead, page 3, last paragraph of the specification states “radiator means provided in the at least one air passage so as to be in contact with outer surfaces of the cells”.

Claim Objections

7. Claim 24 is objected to because of the following informalities: In claim 24, “reminder” should be “remainder”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 6 and 8-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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In claim 6, the limitation “the radiator fins includes a plurality of horizontal fins with different lengths, the fins being arranged in parallel both with respect to any of the other fins” is indefinite because it is unclear whether the other fins are only the fins of each plate or other fins of other radiator plates. It is recommended to the applicants to rewrite this limitation as “the radiator fins of each plate includes a plurality of horizontal fins with different lengths, the fins being arranged in parallel both with respect to any of the other fins in the plate”.

In claim 8, the limitation “the heat conditions of the corresponding cells” is indefinite because it is unclear what the term “heat conditions” means and it is not clearly defined in the specification.

In claim 8, the limitation “the radiator means having portions each of which corresponds to at least one of the cells” is indefinite because it is unclear how the portions corresponds to the at least one of the cells. Is the correspondence an indirect one (e.g., a mapping or an association of the portions of the radiator means to the corresponding cells) or a direct one (e.g., the portions of the radiator means contact the corresponding cells)? The limitation is also indefinite because it unclear how the radiator can have portions that corresponds to the at least one of the cells since this claim language implies that the radiator means is part of the cells but yet the radiator means appears to be external to the cells since the radiator means contact one or more outer surfaces of the cells.

Also in claim 8, it is unclear why the portions of the radiator would have different heat capacities according to the “heat conditions” of the corresponding cells when the radiator is in contact with only one outer surface of the cell.

In claim 13, the limitation “different heat conditions” is indefinite because it is unclear what the term “heat conditions” means and it is not clearly defined in the specification.

In claim 14, the limitation “the battery pack comprises one first cell group located generally in the center thereof and two second cell groups interposing the first cell group across branches of the at least one air passage” is indefinite because it is unclear how two second cell groups can interpose the first cell group when the first cell group is located at the center of the battery pack. It would appear that the first cell group is interposed between the two second cell groups. Furthermore, it is also unclear what the branches of the at least one air passage are because it appears from the specification that the two second cell groups define the branches of the at least one air passage and these two second cell groups would lie along the branches of the at least one air passage and not across the branches of the at least one air passage.

In claim 15, the limitation “the first radiator plate surrounding the first cell group around an entire periphery” is indefinite because it is unclear what this periphery is.

In claim 18, the limitation “the first radiator plate and the second radiator plates have a plurality of portions corresponding to different cells and adapted to remove heat from the corresponding cells” is indefinite because it is unclear how the radiator plates can have portions that correspond to different cells when the radiator plates are not the cells themselves and it is unclear how the portions are adapted to remove heat from the corresponding cells.

In claim 18, the limitation “the heat conditions of the corresponding cells” is indefinite because it is unclear what the term “heat conditions” means and it is not clearly defined in the specification.

In claim 23, the limitation “the portion of each second radiator plate corresponding to the intermediate cell including two bulges adjacent to and interposing the intermediate cell” is indefinite because it is unclear how the portion of each second radiator plate corresponds to the intermediate cell when the radiator plates are not the cells themselves and the intermediate cell is interposed between the two bulges as shown in Figure 15. The two bulges do not interpose the intermediate cell because they appear to sandwich the intermediate cell as seen in Figure 15.

Claims depending from claims rejected under 35 U.S.C. 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1 and 2 are rejected under 35 U.S.C. 102(a) as being anticipated by EP 0994523

A1.

With respect to claim 1, EP 0994523 A1 discloses a battery comprising a case 20 (see Figure 1) containing a plurality of cells 4 (see Figure 2), an air passage 32 (see Figure 5) formed within the case for allowing cooling air outside the case to enter the case and to pass along the cells and exit from the case, and a U-shaped radiator 9 (see Figure 3) provided in the air passage 32 is in contact with more than one outer surfaces of the cells 4 (see Figure 2), and the heat capacity of the radiator increases in the downstream direction of a flow of the cooling air as

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shown in Figures 5 and 6 where a plurality of fins 10 are present in a downstream direction of the flow of cooling air.

With respect to claim 2, the plurality of fins 10 increases the surface area and the volume of the radiator in the downstream direction of the flow of the cooling air (see Figure 6).

12. As best understood, claims 8-12 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0940864 A2.

With respect to claim 8, EP 0940864 A2 discloses a battery pack comprising a case containing a plurality of cells 36 (See Figure 4a). A fluid passage must be present in the case to allow fluid outside of the case to enter the case and pass along the cells and exit from the case since an inlet 92 of the battery pack housing shown in Figure 4A enables the fluid to pass from a fan in a tool housing (for example, see cordless power tool 20 shown in Figure 1 attached to a battery pack 26) through the battery pack (see paragraph 38). In the reference, the fluid is the cooling air as evidenced by paragraphs 49 and 50 and Figure 13 where the terms fluid and air have been used interchangeably.

The cooling air entered through inlet 92 of the battery pack would exit the battery pack through ventilation slots 90 (See paragraph 38). A heat sink 84 is positioned between the cells for wicking the heat from the battery cells 36 (see Figure 4A). The heat sink 84 (the radiator means) has projecting portions 86 that surround the batteries to effectively move heat towards the fins 88 of the heat sink (see paragraph 37). The heat sink 84 may be a metallic sink with the projection portions 86 being metallic or a thermally conductive medium to extract heat from the cells to the heat sink (see paragraph 37). More fins as well as larger projecting portions surround

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battery cells which are known to have higher temperatures during charging of the battery as well as discharging when the cordless power tool is used (see paragraph 37) reads on the radiator means having portions which have different heat capacities according to the “heat conditions” of the corresponding cells in claim 8.

With respect to claim 10, since more fins as well as larger projecting portions surround battery cells which are known to have higher temperatures during charging of the battery as well as discharging, the heat capacity of the portion of the heat sink surrounding these battery cells is increased compared to other portions of the heat sink surrounding battery cells having lower temperatures and the thickness of the portion of the heat sink surrounding the higher temperature battery cells is thicker since there are more fins as well as larger projecting portions surrounding these battery cells. Furthermore, paragraph 11 of the reference states that the heat sink may include an increased concentration of material in areas having higher temperature cells which implies that these areas have thicker heat sink portions.

Furthermore, with respect to claims 9-12, the heat capacity of each portion of the radiator means is inherently determined by the combination of the area of contact of the portion of the radiator means with the corresponding cell, the thickness of the portion, and the material of the portion.

13. Claims 1-4, and 8-13 are rejected under 35 U.S.C. 102(a) as being anticipated by JP 2000-133225 A.

With respect to claims 1, 3, and 8, JP 2000-133225 discloses a battery pack comprising a plurality of battery cells 2 and a casing 1 and a radiator or radiator means comprising a plurality of regulation members 5 extending along the longitudinal direction of the secondary cells, and the plurality of regulation members form the passage of the cooling air between the peripheral sides of the battery cells (see claim 1 of machine translation). The battery case has an air intake duct 31 to allow cooling air outside the case to enter the case, pass along and between the cells, and exit from the case through exhaust port 42 (see paragraph 12 of machine translation and Figure 1). When the cooling air flows from the upstream side to the downstream side during heat exchange with the battery cells 2, the temperature of the air rises gradually (see paragraph 4 of machine translation). By gradually increasing the cross section of the regulation members 5 located in a line along the direction of flow of the air for cooling, the cross section of the passage of air is gradually decreased toward the downstream direction of the flow of cooling air and the rate of the air flow increases in the downstream direction and the heat transfer between the regulation members and the batteries in the downstream direction is increased (see paragraphs 16 and 17 of machine translation). Furthermore, gradually increasing the cross-sectional area of the regulation members 5 also inherently increases the heat capacity of the regulation members.

With respect to claim 2, when the cross-sectional area of the regulation members is gradually increased, the surface area and the volume of the regulation members also inherently increase (see Figures 3 and 6).

With respect to claim 4, the regulation members can be contoured to conform to the outer surfaces of the cells as seen in Figure 6e.

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With respect to claims 9-12, the heat capacity of each portion of the radiator means or radiator is inherently determined by the combination of the area of contact of the portion of the radiator means or radiator with the corresponding cell, the thickness of the portion, and the material of the portion.

With respect to claim 13, the regulation members 5 includes a plurality of plates located at inner surfaces of the case that are in contact with one of the first and second cell groups, the first and second cell groups being the plurality of two battery cells arranged along the direction of air flow and since the temperature of the air increases in downstream direction of the air flow, the plurality of two battery cells located in the downstream direction would be hotter than the plurality of two battery cells in the upstream direction of the air flow if the radiator means or radiator was not present (see Figure 3).

Allowable Subject Matter

14. Claims 5 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Claims 6, and 14-24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter:

The present invention claims a battery pack with the distinguishing feature of at least one radiator provided in at least one air passage formed within the case of the battery pack that is in contact with one or more outer surfaces of the cells in the battery pack, the heat capacity of the at least one radiator increases in the downstream direction of a flow of the cooling air and each radiator is a generally rectangular plate having an inner surface contoured to conform to the outer surfaces of the cells and the outer surface of each radiator plate has a plurality of radiator fins protruding into the respective air passage (applies to claims 5-7).

The closest prior art of record, EP 0994523 A1 discloses a U-shaped radiator surrounding the cells of a battery pack and located in an air passage formed within the case of the battery pack but does not disclose, teach, or suggest that the radiator is a generally rectangular plate having an inner surface contoured to conform to the outer surfaces of the cells and an outer surface of each radiator plate having a plurality of radiator fins protruding into the respective air passage (applies to claims 5-7).

The present invention also claims a battery pack having at least one air passage formed within the case to allow cooling air outside the case to enter the case, and to pass at least one of along and between the cells and exit the case, radiator means provided in the at least one air passage to be in contact with the outer surfaces of the cells, the radiator means having portions in contact with the corresponding cells, wherein the portions have different heat capacities, and the cells are divided into a first cell group located in the center of the battery pack and two second

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cell groups along the branches of the at least one air passage, the first cell group interposing the two second cell groups, and the radiator means includes a plurality of radiator plates having different heat capacities, each radiator plate being in contact with one of the first and second cell groups (applies to claims 14-24).

The closest prior art of record, JP 2000-133225 A discloses battery pack comprising a radiator means provided in at least one air passage of the battery pack, the radiator means comprising a plurality of regulation members lying along the direction of flow of the air for cooling that gradually increases in cross sectional area in the downstream direction of the airflow but does not disclose, teach, or suggest that the battery pack comprises a first cell group located generally in the center of the battery pack and two second cell groups along the branches of the least one air passage and the first cell group interposes the two second cell groups (applies to claims 14-24).

Conclusion

17. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

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The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9310 for regular communications and (703) 872-9311 for After-Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/14 April 2002

Ausy Isang - Foster